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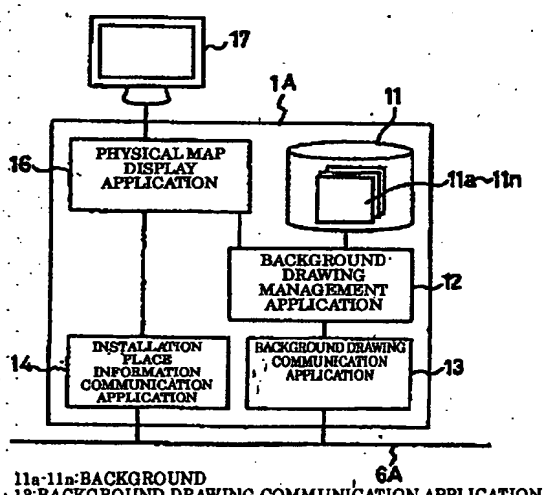
(54) [Title of the Invention] Device and Method for Managing Network

(57) [Abstract]

[Problem] A physical map is manually created by use of a logical map. However, there was a problem that a manager bears a great burden and efficiency is poor.

[Solving Means] A management device includes a physical map display application 16 for creating a physical map 100 based on installation place information from a device to be managed and a background drawing of its own and displaying the map. At least one device to be managed, which is connected to the management device 1A through a network bus 6A, includes an indication device 44 which indicates an installation place of its own on a background drawing sent from the management device, information generation means for generating installation place information from the indicated position and setting the information in an installation place information storage area and transmission means for transmitting the installation place information to the management device.



11a-11n:BACKGROUND
13:BACKGROUND DRAWING COMMUNICATION APPLICATION (FIRST TRANSMISSION MEANS)
14:INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION(FIRST RECEPTION MEANS)
16:PHYSICAL MAP DISPLAY APPLICATION (CREATION MEANS)

[What is claimed is]

[Claim 1] A network management device, comprising:

at least one device to be managed, which is connected to a management device through a network bus,

wherein the management device includes means for transmitting a background drawing to the device to be managed and physical map creation means for creating a physical map based on installation place information from the device to be managed and the same background drawing as the transmitted one and for displaying the physical map on a display device, and

the device to be managed includes indication means for displaying the background drawing sent from the management device on display means and indicating an installation place of its own on the displayed background drawing, information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information storage area and transmission means for transmitting the installation place information to the management device.

[Claim 2] A network management device comprising:

at least one device to be managed, which is connected to a management device through a network bus,

wherein the management device includes first transmission means for transmitting a background drawing to the device to be managed, first reception means for receiving installation place information from the device to be managed, an installation place information table for storing the received installation place information and physical map creation means for creating a physical map based on the background drawing and the installation place information table, and

the device to be managed includes second reception means for receiving a background drawing from the management device, display means for displaying the background drawing, indication means for indicating an installation place of its own on the displayed background drawing, information generation means for generating installation place information from an indicated position on the background drawing and

setting the information in an installation place information storage area and second transmission means for transmitting the installation place information to the management device.

[Claim 3] The network management device according to claim 2, wherein the management device includes indication means for indicating an installation place of a device to be managed, which should be changed, on a background drawing of a physical map displayed on a display device, information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information table and transmission means for sending the installation place information to the device to be managed, which should be changed, and changing contents of the installation place information storage area of the device to be managed.

[Claim 4] The network management device according to claim 2, wherein the management device includes prohibition means for prohibiting, by a device to be managed by the management device, another management device and the device to be managed from changing the contents of the installation place information storage area.

[Claim 5] The network management device according to claim 2, wherein the management device includes permission means for permitting a change according to application for change permission from the device to be managed.

[Claim 6] The network management device according to claim 2, wherein the management device includes transmission and reception means for transmitting and receiving a background drawing and installation place information between the management device and another management device and registration means for registering each received information in a background drawing database of its own and an installation place information table of its own, respectively.

[Claim 7] The network management device according to claim 2, wherein the management device includes description means for drawing a line indicating a network cable between a device to be managed and a connector device, which is directly connected to the device to be managed, on the physical map based on an ID of the device to be managed within the connector device and an ID of the device to be managed itself.

[Claim 8] A network management method comprising the steps of:

transferring a background drawing automatically or upon request of a device to be managed, by a management device;

displaying the transferred background drawing on a display device, by the device to be managed;

designating an installation place of its own on this displayed background drawing;

preparing information on this designated installation place;

storing the information in an installation place information storage area;

sending the installation place information to the management device;

storing the information in an installation place information table of the management device; and

creating a physical map based on the stored installation place information and the same background drawing as the transferred one and displaying the map on the display device, by the management device.

[Detailed Description of the Invention]

[0001]

[Technical Field to Which the Invention Belongs]

The present invention relates to a network management device and a management method for managing a number of devices to be managed, which are connected to a network, by use of a management device.

[0002]

[Prior Art]

Conventionally, the network management device of this type has been capable of automatically creating a map showing which network devices to be managed are located on (a logical map). Meanwhile, a map showing which floor of a building each of the devices to be managed is located on, and the like in a background drawing (a physical map) is manually created based on the logical map by a network manager. Note that technologies relevant to the prior art described above are described in, for example, Japanese Patent Laid-Open Nos. Hei 4 (1992)-149761, Hei 2 (1990)-18651 and Hei 3 (1991)-42770.

[0003]

[Problems to be solved by the Invention]

The conventional network management device is configured as described above. Thus, the device only outputs a list of information including character strings related to installation places, which are collected from the devices to be managed regardless of information of the maps. Consequently, it is difficult to recognize a specific installation place of a device to be managed which has trouble. Accordingly, the manager creates the physical map by using the logical map and manually writing the devices to be managed in the background drawing. However, there was a problem that the manager bears a great burden and efficiency is poor.

[0004]

The present invention was made to solve the problem as described above. It is an object of the present invention to obtain a network management device and a management method, which are capable of efficiently creating a physical map visually showing installation places of devices to be managed in a background drawing while reducing burdens on a manager.

[0005]

[Means for solving the Problem]

A network management device according to the invention of claim 1 includes at least one device to be managed, which is connected to a management device through a network bus. The management device includes: means for transmitting a background drawing to the device to be managed; and physical map creation means for creating a physical map based on installation place information from the device to be managed and the same background drawing as the transmitted one and for displaying the physical map on a display device. The device to be managed includes: indication means for displaying the background drawing sent from the management device on display means and indicating an installation place of its own on the displayed background drawing; information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information storage area; and transmission means for transmitting the installation place information to the management device.

[0006]

A network management device according to the invention of claim 2 includes at least one device to be managed, which is connected to a management device through a network bus. The management device includes: first transmission means for transmitting a background drawing to the device to be managed; first reception means for receiving installation place information from the device to be managed; an installation place information table for storing the received installation place information; and physical map creation means for creating a physical map based on the background drawing and the installation place information table. The device to be managed includes: second reception means for receiving a background drawing from the management device; display means for displaying the background drawing; indication means for indicating an installation place of its own on the displayed background drawing; information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information storage area; and second transmission means for transmitting the installation place information to the management device.

[0007]

A network management device according to the invention of claim 3 includes: indication means for indicating an installation place of a device to be managed, which should be changed, on a background drawing of a physical map displayed on a display device; information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information table; and transmission means for sending the installation place information to the device to be managed, which should be changed, and changing contents of an installation place information storage area of the device to be managed.

[0008]

A network management device according to the invention of claim 4 includes prohibition means for prohibiting, by a device to be managed by the network management device, another management device and the device to be managed from changing contents of an installation place information

storage area.

[0009]

A network management device according to the invention of claim 5 includes permission means for permitting a change according to application for change permission from a device to be managed.

[0010]

A network management device according to the invention of claim 6 includes: transmission and reception means for transmitting and receiving a background drawing and installation place information between the network management device and another management device; and registration means for registering each received information in a background drawing database of its own and an installation place information table of its own, respectively.

[0011]

A network management device according to the invention of claim 7 includes description means for drawing a line indicating a network cable between a device to be managed and a connector device, which is directly connected to the device to be managed, on a physical map based on an ID of the device to be managed within the connector device and an ID of the device to be managed itself.

[0012]

A network management method according to the invention of claim 8 includes the steps of: transferring a background drawing automatically or upon request of a device to be managed, by a management device; displaying the transferred background drawing on a display device, by the device to be managed; designating an installation place of its own on this displayed background drawing; preparing information on this designated installation place; storing the information in an installation place information storage area; sending the installation place information to the management device; storing the information in an installation place information table of the management device; and creating a physical map based on the stored installation place information and the same background drawing as the transferred one and displaying the map on the display device, by the management device.

[0013]

[Embodiment of the Invention]

An embodiment of the present invention will be described below.

Embodiment 1

Fig. 1 shows a connection diagram of the entire network connecting network management devices. Reference numerals 1A and 1B are management devices, reference numerals 2A to 2C and 3A to 3C are a plurality of devices to be managed, which are connected to the management devices 1A and 1B through buses (LANs) 6A and 7A and reference numeral 8 is a network (WAN) which connects the busses 6A and 7A.

[0014]

Fig. 2 is a block diagram showing the management device according to embodiment 1 of the present invention. Fig. 2 describes the management device 1A. In Fig. 2, reference numeral 11 is a background drawing database storing a plurality of background drawings 11a to 11n, reference numeral 12 is a background drawing management application, reference numeral 13 is a background drawing communication application (first transmission means), reference numeral 14 is an installation place information communication application (first reception means), reference numeral 16 is a physical map display application (creation means) and reference numeral 17 is a display device. Note that, since the other management device 1B has exactly the same configuration as that of the management device 1A, repetitive description will be omitted.

[0015]

Fig. 3 is a block diagram showing the device to be managed. Fig. 3 describes the device to be managed 2A. In Fig. 3, reference numeral 41 is a background drawing communication application (second reception means) which receives a background drawing from the management device 1A through the bus 6A, reference numeral 42 is a background drawing display application which displays the background drawing on a display device (display means) 43, reference numeral 44 is an indication device (indication means), such as a mouse, which clicks on a place where the device to be managed 2A is located on the background drawing, reference numeral 45 is an installation place information generation application (information generation means) which generates installation place information of the device to be managed 2A clicked by the indication device 44, reference

numeral 46 is an installation place information storage area which stores the installation place information generated by the installation place information generation application 45 and reference numeral 47 is an installation place information communication application (second transmission means) which sends the installation place information to the management device through the bus 6A. Note that, since the other devices to be managed 2B, 2C and 3A to 3C have exactly the same configuration as that of the device to be managed 2A, repetitive description will be omitted.

[0016]

Fig. 4 is a plan view of a second floor of a building, showing an example of the background drawing 11a. Reference numerals 201 to 205 indicate rooms, reference numeral 206 indicates a staircase and reference numeral 207 indicates a hallway.

[0017]

Next, description will be given of operations based on a flowchart of Fig. 5 showing a physical map creation procedure and a view of Fig. 6 showing an installation place information determination procedure of the device to be managed. First, in a starting step, the device to be managed 2A starts the background drawing communication application 41 and requests the background drawing 11a from the management device 1A. Upon this request, the management device 1A transfers a list of the background drawings 11a to 11n read from the background drawing database 11 to the device to be managed 2A through the background drawing communication application 13 and the background drawing management application 12 (Step ST5-1).

[0018]

In a background drawing transfer step, the device to be managed 2A specifies a relevant background drawing from the list of the background drawings sent from the management device 1A and sends an ID of the background drawing to the management device 1A. The management device 1A determines a background drawing to be transferred according to the received ID and sends the background drawing to the device to be managed 2A (Step ST 5-2).

[0019]

Next, in a display step, the device to be managed 2A displays the

received background drawing 11a on the display device 43 by use of the background drawing display application 42 (Step ST5-3). Thereafter, in an installation place designation step, the device to be managed 2A designates an installation place of its own, by use of the indication device 44, on the background drawing displayed on the display device 43 (Step ST5-4).

[0020]

Subsequently, in an information generation step, installation place information is generated by use of the installation place information generation application 45 in such a manner that coordinates (Xa, Ya) of the installation place on the background drawing are determined, as shown in Fig. 7, from the position designated by the indication device 44. Thereafter, the installation place information is stored in the installation place information storage area 46 (Step ST5-5).

[0021]

After the installation place information is stored, in a physical map creation step, the management device 1A creates a physical map 100 shown in Fig. 8 and displays the map on the display device 17 (Step ST5-6). Specifically, the physical map 100 is created based on the background drawing 11a, which is obtained by the physical map display application 16 through the background drawing management application 12, and installation place information of the devices to be managed, which is obtained through the installation place information communication application 14 of its own and the installation place information communication applications 47 of the plurality of devices to be managed. Note that, in the physical map 100, reference numerals 9A to 9C are connector devices and Ls are connection lines connecting devices to be managed 2A to 2C, 3A to 3C and 4A to 4C with the connector devices 9A to 9C, respectively.

[0022]

As described above, according to embodiment 1, the physical map 100 visually showing the installation place of the device to be managed 2A together with the background drawing 11a can be displayed on the display device 17 of the management device 1A. Thus, in case of trouble, it is possible to intuitively determine where the devices to be managed having trouble are installed. Note that, in embodiment 1 described above, the

device to be managed 2A can also transmit the information in the installation place information storage area 46 to the management device 1A upon request from the management device 1A.

[0023]

Embodiment 2

Fig. 9 is a block diagram showing a management device 1A according to embodiment 2 of the present invention. The same parts as those of Fig. 1 described above will be denoted by the same reference numerals and repetitive description will be omitted. In Fig. 9, reference numeral 15 is an installation place information table which stores installation place information sent from a device to be managed.

[0024]

Fig. 10 is a flowchart for explaining operations. Since Steps ST10-1 to ST10-5 are the same operations as Steps ST5-1 to ST5-5 of Fig. 5 described above, repetitive description will be omitted. In Step ST10-6, installation place information is sent to the management device 1A from the device to be managed 2A through the installation place information communication applications 47 and 14 of the device to be managed 2A and the management device 1A and the installation place information is stored in the installation place information table 15. In this installation place information table 15, as shown in Fig. 11, device to be managed IDs 81, background drawing IDs 82 and coordinates 83 are stored. Therefore, in the physical map creation step, the management device 1A creates the physical map 100 shown in Fig. 8 described above based on the background drawing 11a, which is obtained by the physical map display application 16 through the background drawing management application 12, and the installation place information of the device to be managed 2A, which is read from the installation place information table 15. Thereafter, the management device 1A displays the map on the display device 17 (Step ST10-7). In embodiment 2 described above, not only the method of transmitting the information in the installation place information storage area 46 to the management device 1A by the device to be managed 2A upon request from the management device 1A but also a method of voluntarily transmitting the information by the device to be managed can be adopted.

[0025]

Embodiment 3

Fig. 12 is a flowchart showing an operation procedure according to embodiment 3 of the present invention. With reference to Fig. 12, description will be given of a processing procedure for an installation place information change request of the device to be managed 2A through the network. After the operation is started, in a reception step, the installation place information communication application 47 of the device to be managed 2A receives an installation place information change request (including the background drawing ID and coordinates) together with an ID of the device making the request (Step ST12-1). Thereafter, in a first determination step, it is determined whether or not a field for a management device ID 121 (shown in Fig. 18) in the installation place information storage area 46 is empty (Step ST12-2). If NO, in a second determination step, it is determined whether or not the received ID of the device making the request coincides with the management device ID 121 in the installation place information storage area 46 (Step ST12-3). If NO, the installation place information change request is rejected in a rejection step (Step ST12-4) and the operation is finished. Meanwhile, if the determination results in Steps ST12-2 and ST12-3 described above are YES, in a setting step, a background drawing ID 123 (shown in Fig. 18) and coordinates 124 (shown in Fig. 18), which are received according to the installation place information change request, are set (Step ST12-5).

[0026]

Embodiment 4

Fig. 13 is a view showing a processing procedure for an installation place information change request from the device to be managed 2A according to embodiment 4 of the present invention. With reference to Fig. 13, an operation will be described. After the operation is started, a user starts the background drawing communication application 41 of the device to be managed 2A in a starting step (Step ST13-1) and, in a determination step, determines whether or not a device to be managed change prohibition flag in the installation place information storage area 46 is ON (Step ST13-2).

[0027]

If the determination result is NO, in a continuation step, the

processing of the background drawing communication application 41 is continued and the operation is finished (Step ST13-3). If YES, in a finish step, the background drawing communication application 41 is finished and the operation is finished (Step ST13-4).

[0028]

Embodiment 5

Fig. 14 is a block diagram showing a management device 1A according to embodiment 5 of the present invention. The same parts as those of Fig. 9 described above will be denoted by the same reference numerals and repetitive description will be omitted. In Fig. 14, reference numeral 18 is an indication device, such as a mouse, as indication means for indicating an installation place of a device to be managed, which should be changed, on a background drawing of a physical map 100 displayed on the display device 17. Reference numeral 19 is an installation place information generation application as information generation means for generating installation place information from the indicated position on the background drawing and setting the information in the installation place information table 15. The installation place information communication application 14 is operated as transmission means for sending the installation place information to the device to be managed, which should be changed, and changing contents of the installation place information storage area 46 in the device to be managed.

[0029]

Fig. 15 is a view showing a procedure of changing the contents of the installation place information storage area 46 in the device to be managed by the management device 1A according to embodiment 5 of the present invention. With reference to Fig. 15, operations will be described. First, when a user of the management device 1A changes the installation position of the device to be managed on the physical map 100 by use of the indication device 18, the installation place information generation application 19 determines coordinates on a background drawing ID of the installation place from the changed position. Thereafter, the coordinates and the background drawing ID are stored in a relevant place of the device to be managed in the installation place information table 15.

[0030]

Next, the installation place information communication application 14 generates an installation place change request based on the coordinates and the background drawing ID, which are stored in the installation place information table 15, and transmits the ID of the management device and the installation place change request to the device to be managed, which should be changed.

[0031]

The device to be managed, which has received the ID of the management device and the installation place change request, checks the management device ID 121 field in the installation place information storage area 46 against the ID of the management device and verifies whether or not the ID of the management device is the same or whether or not the management device ID 121 field in the installation place information storage area 46 is empty. Thereafter, a background drawing ID in the received installation place change request is set in the background drawing ID 123 field in the installation place information storage area 46 and coordinates in the received installation place change request are set in the coordinates 124 field in the installation place information storage area 46.

[0032]

As described above, according to embodiment 5, the device to be managed designates the installation position of its own on the background drawing in its own way without regard to a relationship with the other devices to be managed. Thus, in such a case where a positional relationship between the devices to be managed is wrong in the physical map showing all the devices to be managed, the installation place information of the devices to be managed can be changed in the management device displaying the physical map.

[0033]

Embodiment 6

Fig. 16 is a block diagram showing a management device 1A according to embodiment 6 of the present invention. The same parts as those of Fig. 1 will be denoted by the same reference numerals and repetitive description will be omitted. In Fig. 16, reference numeral 20 is an installation place information protection application.

[0034]

Fig. 17 is a block diagram showing a device to be managed 2A. The same parts as those of Fig. 2 will be denoted by the same reference numerals and repetitive description will be omitted. In Fig. 17, reference numeral 48 is an installation place information protection application.

[0035]

Fig. 18 shows a structure of the installation place information storage area 46 in the device to be managed 2A. The structure includes the management device ID 121, a device to be managed change prohibition flag 122, the background drawing ID 123 and the coordinates 124.

[0036]

Next, operations will be described. First, with reference to Fig. 19 showing a procedure, description will be given of third party change prohibition which prohibits a person other than the user of the management device 1A from changing contents of the installation place information storage area 46 in the device to be managed 2A from the management device 1A.

[0037]

The installation place information protection application 20 of the management device 1A transmits an ID of the management device 1A and a third party change prohibition request to the device to be managed 2A. Thereafter, the device to be managed 2A, which has received those described above, checks if the management device ID 121 field in the installation place information storage area 46 is empty in the installation place information protection application 48 and sets the received ID of the management device 1A in the management device ID 121 field. Therefore, after the processing described above, the contents of the installation place information storage area 46 cannot be changed except by the management device 1A of the ID described above.

[0038]

As described above, according to embodiment 6, it can be realized that the once created physical map 100 cannot be changed without permission of a user of a specific management device. Thus, it is possible to protect the installation place information from users of computer devices with bad intentions and ensure reliability of a newly generated installation place change of the device to be managed.

[0039]

Embodiment 7

Fig. 20 is a view showing a procedure of prohibiting change of a device to be managed according to embodiment 7 of the present invention. With reference to Fig. 20, operations will be described. When a user specifies device to be managed change prohibition, the installation place information protection application 20 of the management device 1A, after being started, transmits an ID of the management device and a device to be managed change prohibition request. The device to be managed 2A, which has received those described above, checks the management device ID 121 field in the installation place information storage area 46 against the received ID of the management device in the installation place information protection application 48. If the both coincide with each other, a device to be managed change prohibition flag in the installation place information storage area 46 is set to ON. Thus, a user of the device to be managed 2A cannot change contents of the installation place information storage area 46, either.

[0040]

Embodiment 8

Fig. 21 is a view showing a change prohibition lifting procedure from the device to be managed 2A according to embodiment 8 of the present invention. With reference to Fig. 21, operations will be described. The configurations of the management device 1A and the device to be managed 2A are the same as those shown in Figs. 16 and 17. First, the installation place information protection application 48 of the device to be managed 2A transmits an ID of the device to be managed 2A and a change prohibition lifting request. Thereafter, the installation place information protection application 20 of the management device 1A, which has received those described above, displays on the display device 17 that the ID of the device to be managed 2A and the change prohibition lifting request are received.

[0041]

The user of the management device 1A, who has seen the display described above, approves the installation place change and transmits the ID of the management device 1A and a change prohibition lifting response. The installation place information protection application 48 of the device to

be managed 2A, which has received those described above, checks the ID of the management device 1A against the management device ID 121 field in the installation place information storage area 46, sets the device to be managed change prohibition flag in the installation place information storage area 46 to OFF and displays on the display device 43 that the change prohibition is lifted.

[0042]

Embodiment 9

Fig. 22 is a view showing a procedure of transmitting and receiving a background drawing and an installation place table between management devices according to embodiment 9 of the present invention. With reference to Fig. 22, description will be given of operations of transmitting and receiving the background drawing and the installation place information table between the management devices and registering each received information in a background drawing database of its own and an installation place information table of its own, respectively.

[0043]

For example, an ID of a requestor management device 1A and a background drawing request are transmitted from the background drawing communication application 13 of the requestor management device 1A. Accordingly, the background drawing communication application 13 of a responder management device 1B, for example, receives the ID and the request and transmits a background drawing ID and a background drawing to the requestor management device 1A through the background drawing management application 12.

[0044]

The requestor management device 1A, which has received those described above, registers the background drawing ID and the background drawing in the background drawing database 11 through the background drawing management application 12. Thereafter, the requestor management device 1A transmits the ID of the requestor management device 1A and an installation place information table request by use of the installation place information communication application 14.

[0045]

The installation place information communication application 14 of

the responder management device 1B, which has received those described above, transmits contents of the installation place information table 15. The requestor management device 1A adds the received contents of the installation place information table 15 to the existing installation place information table 15.

[0046]

As described above, according to embodiment 9, a certain management device can display a physical map 100 created by another management device. For example, considering a corporate structure including a head office, a branch office A and a branch office B, a physical map of the branch office A is created by a management device of the branch office A and a physical map of the branch office B is created by a management device of the branch office B. In a management device of the head office, background drawings and installation place information tables are transmitted thereto from the management devices of the branch offices A and B. Thus, the physical maps of the branch offices A and B can be displayed in the management device of the head office to grasp installation places of respective devices to be managed.

[0047]

Embodiment 10

Fig. 23 is a view showing an installation place information table 15 according to embodiment 10 of the present invention. In the installation place information table 15, a device to be managed ID 191, a background drawing ID 192, coordinates 193 and a device to be managed ID list 194 are stored. Contents of the device to be managed ID list 194 are set in such a manner that a management device regularly collects IDs of devices to be managed, which are stored in intelligent connector devices.

[0048]

Therefore, by checking the device to be managed ID 191 field and the device to be managed ID list 194 field in the extended installation place information table 15, the physical map display application 16 recognizes connections between the devices to be managed and the connector devices and can automatically draw lines on the physical map.

[0049]

As described above, according to embodiment 10, on the physical

map, lines indicating network cables can be automatically drawn between the devices to be managed and the connector devices. As to a connector device or a network cable, which has no ID (network address) that can be automatically identified by the management device, it was required for the user of the management device to check an installation place thereof and describe the place on the physical map. However, the processing described above can be partially automated. Thus, burdens on the user of the management device can be reduced.

[0050]

Note that, as to the connector device described above, the user of the management device designates an installation place thereof on the physical map by use of the indication device. Thus, an ID is allocated to the connector device so as not to overlap an ID of another device to be managed in the management device and registered in the installation place information table.

[0051]

Moreover, the connector device used in the present invention has a function capable of automatically detecting the ID (network address) of the connected device to be managed from communicated data and the like and storing the ID.

[0052]

[Effects of the Invention]

As described above, according to the invention of claim 1, a background drawing sent from a management device is displayed on a display device of a device to be managed. Thereafter, a user of the device to be managed designates an installation place of its own in the background drawing, generates installation place information from the designated position, stores the installation place information in an installation place information storage area and sends the information to the management device. In the management device, a physical map is created by use of the installation place information and the background drawing and is displayed on a display device of the management device. Thus, there is an effect that the physical map showing the installation position of the device to be managed in the background drawing can be created while reducing burdens on the user of the management device and that efficient network

management can be performed.

[0053]

Moreover, the display device can output a physical map visually showing an actual installation place of the device to be managed onto the management device. Thus, there is an effect that, in case of trouble, it is possible to immediately determine which one of the devices to be managed has trouble.

[0054]

According to the invention of claim 2, the management device is configured to include an installation place information table storing the installation place information from the device to be managed. Thus, there is an effect that the physical map can be efficiently and repeatedly displayed by use of the installation place information of the device to be managed.

[0055]

According to the invention of claim 3, the management device includes indication means for indicating an installation place of a device to be managed, which should be changed, on the background drawing of the physical map displayed on the display device, information generation means for generating installation place information from the indicated position on the background drawing and setting the information in an installation place information table and transmission means for sending the installation place information to the device to be managed, which should be changed, and changing contents of the installation place information storage area of the device to be managed. There is a case where a positional relationship between the devices to be managed is wrong in the physical map showing the devices to be managed. In such a case, there is an effect that the installation place information of the devices to be managed can be changed in the management device displaying the physical map.

[0056]

According to the invention of claim 4, the management device includes means for prohibiting, by the device to be managed, another management device and the device to be managed from changing values of the installation place information storage area and means for permitting a change according to application for change permission from the device to be managed. Thus, the once created physical map cannot be changed without

permission of the user of the management device. Consequently, there is an effect that it is possible to protect the installation place information from users of computer devices with bad intentions and to ensure reliability of a newly generated installation place change of the device to be managed.

[0057]

According to the invention of claim 5, the management device includes permission means for permitting a change according to application for change permission from the device to be managed. Thus, there is an effect that it is possible to surely prevent the device to be managed from changing the stored installation place without permission.

[0058]

According to the invention of claim 6, the management device includes means for transmitting and receiving a physical map background drawing and an installation place information table between the management device and another management device and means for registering each received information in a background drawing database of its own and an installation place information table of its own, respectively. Thus, there is an effect that a certain management device can display a physical map created by another management device and installation places of respective devices to be managed can be precisely grasped.

[0059]

According to the invention of claim 7, the management device includes means for drawing a line indicating a network cable between a device to be managed and a connector device, which is directly connected to the device to be managed, on the physical map of the management device based on an ID of the device to be managed within the connector device and an ID of the device to be managed itself. Thus, there is an effect that a connector device and a network cable, which have no ID (network address) that can be automatically identified by the management device, can be indicated on the physical map while reducing the burdens on the user of the management device.

[0060]

According to the invention of claim 8, after allowing a device to be managed itself to designate an installation place of its own on a background drawing sent by the management device, the management device creates a

physical map by use of installation place information sent from the device to be managed and the background drawing. Thus, there is an effect that the physical map can be easily and accurately created while reducing the burdens on the user of the management device.

[Brief Description of the Drawings]

Fig. 1 is a connection diagram of entire network management devices.

Fig. 2 is a block diagram showing a management device according to embodiment 1 of the present invention.

Fig. 3 is a block diagram showing a device to be managed according to embodiment 1 of the present invention.

Fig. 4 is an explanatory view of a background drawing.

Fig. 5 is a flowchart showing a physical map creation procedure according to embodiment 1 of the present invention.

Fig. 6 is a view showing an installation place information determination procedure of the device to be managed.

Fig. 7 is a view showing determination of an installation place on the background drawing.

Fig. 8 is a view showing a physical map.

Fig. 9 is a block diagram showing a management device according to embodiment 2 of the present invention.

Fig. 10 is a flowchart showing a physical map creation procedure according to embodiment 2 of the present invention.

Fig. 11 is a view showing an installation place information table.

Fig. 12 is a flowchart showing a processing procedure for an installation place information change request through a network according to embodiment 3 of the present invention.

Fig. 13 is a flowchart showing a processing procedure for an installation place information change request from a device to be managed according to embodiment 4 of the present invention.

Fig. 14 is a block diagram showing a management device according to embodiment 5 of the present invention.

Fig. 15 is a view showing a processing procedure for an installation place information change of a device to be managed from the management

device according to embodiment 5 of the present invention.

Fig. 16 is a block diagram showing a management device according to embodiment 6 of the present invention.

Fig. 17 is a block diagram showing a device to be managed according to embodiment 6 of the present invention.

Fig. 18 is a view showing a structure of an installation place information storage area of the device to be managed.

Fig. 19 is a view showing a procedure of prohibiting change of a third party according to embodiment 6 of the present invention.

Fig. 20 is a view showing a procedure of prohibiting change of a device to be managed according to embodiment 7 of the present invention.

Fig. 21 is a view showing a change prohibition lifting procedure from a device to be managed according to embodiment 8 of the present invention.

Fig. 22 is a view showing a procedure of transmission and reception between management devices according to embodiment 9 of the present invention.

Fig. 23 is a view showing an installation place table according to embodiment 10 of the present invention.

[Explanation of Reference Numerals]

1A, 1B management device

2A to 2C, 3A to 3C, 4A to 4C device to be managed

11a to 11n background drawing

13 background drawings communication application (first transmission means)

14 installation place information communication application (first reception means)

15 installation place information table

16 physical map display application (creation means)

41 background drawing communication application (second reception means)

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	15/00	310
H04L	12/46	
	12/28	
	12/24	
	12/26	

[FI]

G06F	13/00	353	T
	15/00	310	R
H04L	11/00	310	C
	11/08		

[Amendment]
[Date Submitted] Heisei 9-8-22 (August 22, 1997)
[Amendment 1]
[Name of Document of Object for Amendment] Specification
[Item Name of Object for Amendment] Claim 1
[Method for Amendment] Change
[Contents of Amendment]
[What is claimed is]
[Claim 1] A network management device, comprising:

at least one device to be managed, which is connected to a management device through a network bus,

wherein the management device includes means for transmitting a background drawing to the device to be managed and physical map creation

means for creating a physical map based on installation place information from the device to be managed and the same background drawing as the transmitted one and for displaying the physical map on a display device, and the device to be managed includes indication means for displaying the background drawing sent from the management device on display means and indicating an installation place of its own on the displayed background drawing, information generation means for generating installation place information from an indicated position on the background drawing and setting the information in an installation place information storage area and transmission means for transmitting the installation place information to the management device.

[Amendment 2]

[Name of Document of Object for Amendment] Specification

[Item Name of Object for Amendment] 0022

[Method for Amendment] Change

[Contents of Amendment]

[0022] As described above, according to embodiment 1, the physical map 100 visually showing the installation place of the device to be managed 2A together with the background drawing 11a can be displayed on the display device 17 of the management device 1A. Thus, in case of trouble, it is possible to intuitively determine where the devices to be managed having trouble are installed. Note that, in embodiment 1 described above, the device to be managed 2A transmits the information in the installation place information storage area 46 to the management device 1A upon request from the management device 1A.

Drawings

Fig. 1

1A MANAGEMENT DEVICE
1B MANAGEMENT DEVICE
2A DEVICE TO BE MANAGED
2B DEVICE TO BE MANAGED
2C DEVICE TO BE MANAGED
3A DEVICE TO BE MANAGED
3B DEVICE TO BE MANAGED
3C DEVICE TO BE MANAGED
8 NETWORK

Fig. 2

11a to 11n BACKGROUND DRAWING
12 BACKGROUND DRAWING MANAGEMENT APPLICATION
13 BACKGROUND DRAWING COMMUNICATION APPLICATION (FIRST TRANSMISSION MEANS)
14 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION (FIRST RECEPTION MEANS)
16 PHYSICAL MAP DISPLAY APPLICATION (CREATION MEANS)

Fig. 3

41 BACKGROUND DRAWING COMMUNICATION APPLICATION (SECOND RECEPTION MEANS)
42 BACKGROUND DRAWING DISPLAY APPLICATION
45 INSTALLATION PLACE INFORMATION GENERATION APPLICATION
47 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION

Fig. 4

BUILDING

Fig. 5

START
PROCESSING OF EACH DEVICE TO BE MANAGED
ST5-1 STARTING STEP
ST5-2 BACKGROUND DRAWING TRANSFER STEP
ST5-3 DISPLAY STEP
ST5-4 INSTALLATION PLACE DESIGNATION STEP
ST5-5 INFORMATION GENERATION STEP
PROCESSING OF MANAGEMENT DEVICE
ST5-6 PHYSICAL MAP CREATION STEP
END

Fig. 6
DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION GENERATION APPLICATION
BACKGROUND DRAWING DISPLAY APPLICATION
BACKGROUND DRAWING COMMUNICATION APPLICATION
START
REQUEST BACKGROUND DRAWING INFORMATION
USER SPECIFIES RELEVANT BACKGROUND DRAWING FROM BACKGROUND DRAWING LIST
TRANSMIT ID OF RELEVANT BACKGROUND DRAWING
RECEIVE BACKGROUND DRAWING
DISPLAY BACKGROUND DRAWING
USER DETERMINES COORDINATES OF INSTALLATION PLACE ON BACKGROUND DRAWING FROM POSITION INDICATED BY INDICATION DEVICE
STORE BACKGROUND DRAWING ID AND COORDINATES IN INSTALLATION PLACE INFORMATION STORAGE AREA

BACKGROUND DRAWING INFORMATION REQUEST
BACKGROUND DRAWING LIST
BACKGROUND DRAWING ID
BACKGROUND DRAWING

MANAGEMENT DEVICE

BACKGROUND DRAWING COMMUNICATION APPLICATION
BACKGROUND DRAWING MANAGEMENT APPLICATION
RETURN BACKGROUND DRAWING LIST TOGETHER WITH BACKGROUND DRAWING ID
DETERMINE BACKGROUND DRAWING TO BE TRANSMITTED BASED ON BACKGROUND DRAWING ID
TRANSMIT BACKGROUND DRAWING

Fig. 7
BUILDING
X COORDINATE
Y COORDINATE
Fig. 8
BUILDING
4A to 4C DEVICE TO BE MANAGED

Fig. 9
12 BACKGROUND DRAWING MANAGEMENT APPLICATION
13 BACKGROUND DRAWING COMMUNICATION APPLICATION
14 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
15 INSTALLATION PLACE INFORMATION TABLE
16 PHYSICAL MAP DISPLAY APPLICATION

Fig. 10
START
PROCESSING OF EACH DEVICE TO BE MANAGED
ST10-1 STARTING STEP
ST10-2 BACKGROUND DRAWING TRANSFER STEP
ST10-3 DISPLAY STEP
ST10-4 INSTALLATION PLACE DESIGNATION STEP
ST10-5 INFORMATION GENERATION STEP
ST10-6 INFORMATION STORAGE STEP
PROCESSING OF MANAGEMENT DEVICE

ST10-7 PHYSICAL MAP CREATION STEP
END

Fig. 11
81 ID OF DEVICE TO BE MANAGED
82 BACKGROUND DRAWING ID
UNREGISTERED
UNREGISTERED
83 COORDINATES

Fig. 12
START
ST12-1 RECEPTION STEP
ST12-2 FIRST DETERMINATION STEP
ST12-3 SECOND DETERMINATION STEP
ST12-4 REJECTION STEP
ST12-5 SETTING STEP
END

Fig. 13
START
ST13-1 STARTING STEP
ST13-2 DETERMINATION STEP
ST13-3 CONTINUATION STEP
ST13-4 FINISH STEP
END

Fig. 14
12 BACKGROUND DRAWING MANAGEMENT APPLICATION
13 BACKGROUND DRAWING COMMUNICATION APPLICATION
14 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
16 PHYSICAL MAP DISPLAY APPLICATION
19 INSTALLATION PLACE INFORMATION GENERATION

APPLICATION

Fig. 15

DEVICE TO BE MANAGED

INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION

RECEIVE ID OF MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION CHANGE REQUEST

CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE AND VERIFY WHETHER OR NOT ID OF MANAGEMENT DEVICE IS THE SAME OR WHETHER OR NOT MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA IS EMPTY

SET BACKGROUND DRAWING ID WITHIN RECEIVED INSTALLATION PLACE INFORMATION CHANGE REQUEST IN BACKGROUND DRAWING ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AND SET COORDINATES WITHIN RECEIVED INSTALLATION PLACE INFORMATION CHANGE REQUEST IN COORDINATE FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA

ID OF MANAGEMENT DEVICE + INSTALLATION PLACE INFORMATION CHANGE REQUEST

MANAGEMENT DEVICE

INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION

INSTALLATION PLACE INFORMATION GENERATION APPLICATION

REGARDING DEVICE TO BE MANAGED, WHICH IS CHANGED IN INSTALLATION PLACE INFORMATION TABLE, GENERATE INSTALLATION PLACE INFORMATION CHANGE REQUEST BASED ON BACKGROUND DRAWING ID AND COORDINATES

TRANSMIT ID OF MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION CHANGE REQUEST

USER CHANGES POSITION OF DEVICE TO BE MANAGED ON PHYSICAL MAP BY USE OF INDICATION DEVICE AND DETERMINES COORDINATES OF INSTALLATION PLACE ON BACKGROUND DRAWING FROM CHANGED POSITION
STORE BACKGROUND DRAWING ID AND COORDINATES IN RELEVANT PLACE OF DEVICE TO BE MANAGED OF INSTALLATION PLACE INFORMATION TABLE

Fig. 16
12 BACKGROUND DRAWING MANAGEMENT APPLICATION
13 BACKGROUND DRAWING COMMUNICATION APPLICATION
14 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
16 PHYSICAL MAP DISPLAY APPLICATION
20 INSTALLATION PLACE INFORMATION PROTECTION APPLICATION

Fig. 17
41 BACKGROUND DRAWING COMMUNICATION APPLICATION
42 BACKGROUND DRAWING DISPLAY APPLICATION
45 INSTALLATION PLACE INFORMATION GENERATION APPLICATION
47 INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
48 INSTALLATION PLACE INFORMATION PROTECTION APPLICATION

Fig. 18
121 MANAGEMENT DEVICE ID
122 DEVICE TO BE MANAGED CHANGE PROHIBITION FLAG
VALUE IS ON OR OFF
INITIAL VALUE IS OFF
123 BACKGROUND DRAWING ID

124 COORDINATES

Fig. 19

DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
APPLICATION FOR RECEPTION RECEIVES ID OF MANAGEMENT DEVICE AND THIRD PARTY CHANGE PROHIBITION REQUEST
CONFIRM THAT MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA IS EMPTY
SET RECEIVED ID OF MANAGEMENT DEVICE IN MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA

ID OF MANAGEMENT DEVICE + THIRD PARTY CHANGE PROHIBITION REQUEST

MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
START APPLICATION FOR TRANSMISSION
USER SPECIFIES THIRD PARTY CHANGE PROHIBITION
TRANSMIT ID OF MANAGEMENT DEVICE AND THIRD PARTY CHANGE PROHIBITION REQUEST

Fig. 20

DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
APPLICATION FOR RECEPTION RECEIVES ID OF MANAGEMENT DEVICE AND DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST
CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE
SET DEVICE TO BE MANAGED CHANGE PROHIBITION FLAG IN INSTALLATION PLACE INFORMATION STORAGE AREA TO ON

ID OF MANAGEMENT DEVICE + DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST

MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
START APPLICATION FOR TRANSMISSION
USER SPECIFIES DEVICE TO BE MANAGED CHANGE PROHIBITION
TRANSMIT ID OF MANAGEMENT DEVICE AND DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST

Fig. 21
DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
START APPLICATION FOR TRANSMISSION
TRANSMIT ID OF DEVICE TO BE MANAGED AND CHANGE PROHIBITION LIFTING REQUEST
APPLICATION FOR RECEPTION RECEIVES ID OF MANAGEMENT DEVICE AND CHANGE PROHIBITION LIFTING RESPONSE
CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE
SET DEVICE TO BE MANAGED CHANGE PROHIBITION FLAG IN INSTALLATION PLACE INFORMATION STORAGE AREA TO OFF
DISPLAY ON DISPLAY DEVICE THAT CHANGE PROHIBITION IS LIFTED

ID OF DEVICE TO BE MANAGED + CHANGE PROHIBITION LIFTING REQUEST

ID OF MANAGEMENT DEVICE + CHANGE PROHIBITION LIFTING RESPONSE

MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION

APPLICATION FOR RECEPTION RECEIVES ID OF DEVICE TO BE MANAGED AND CHANGE PROHIBITION LIFTING REQUEST
DISPLAY ON DISPLAY DEVICE THAT CHANGE PROHIBITION LIFTING REQUEST IS RECEIVED
USER OF MANAGEMENT DEVICE APPROVES INSTALLATION PLACE INFORMATION CHANGE AND INSTRUCTS APPLICATION FOR TRANSMISSION
TRANSMIT ID OF MANAGEMENT DEVICE AND CHANGE PROHIBITION LIFTING RESPONSE TO DEVICE TO BE MANAGED WITH RECEIVED ID

Fig. 22
REQUESTOR MANAGEMENT DEVICE

BACKGROUND DRAWING COMMUNICATION APPLICATION
TRANSMIT ID OF REQUESTOR MANAGEMENT DEVICE AND BACKGROUND DRAWING REQUEST
RECEIVE BACKGROUND DRAWING ID AND BACKGROUND DRAWING
REGISTER BACKGROUND DRAWING ID AND BACKGROUND DRAWING IN BACKGROUND DRAWING DATABASE THROUGH BACKGROUND DRAWING MANAGEMENT APPLICATION

INSTALLATION PLACE INFORMATION TRANSMISSION APPLICATION
TRANSMIT ID OF REQUESTOR MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION TABLE REQUEST
RECEIVE INSTALLATION PLACE INFORMATION TABLE
ADD RECEIVED INSTALLATION PLACE INFORMATION TABLE TO EXISTING INSTALLATION PLACE INFORMATION TABLE

ID OF REQUESTOR MANAGEMENT DEVICE + BACKGROUND DRAWING REQUEST
BACKGROUND DRAWING ID + BACKGROUND DRAWING
ID OF REQUESTOR MANAGEMENT DEVICE + INSTALLATION PLACE INFORMATION TABLE REQUEST

INSTALLATION PLACE INFORMATION TABLE

RESPONDER MANAGEMENT DEVICE
BACKGROUND DRAWING COMMUNICATION APPLICATION
RECEIVE ID OF REQUESTOR MANAGEMENT DEVICE AND BACKGROUND DRAWING REQUEST
TRANSMIT BACKGROUND DRAWING ID AND BACKGROUND DRAWING TO REQUESTOR MANAGEMENT DEVICE THROUGH BACKGROUND DRAWING MANAGEMENT APPLICATION

INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
RECEIVE ID OF REQUESTOR MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION TABLE REQUEST
TRANSMIT INSTALLATION PLACE INFORMATION TABLE TO REQUESTOR MANAGEMENT DEVICE

Fig. 23

191 ID OF DEVICE TO BE MANAGED
HUB
192 BACKGROUND DRAWING ID
UNREGISTERED
193 COORDINATES
194 ID LIST OF DEVICE TO BE MANAGED

Fig.1

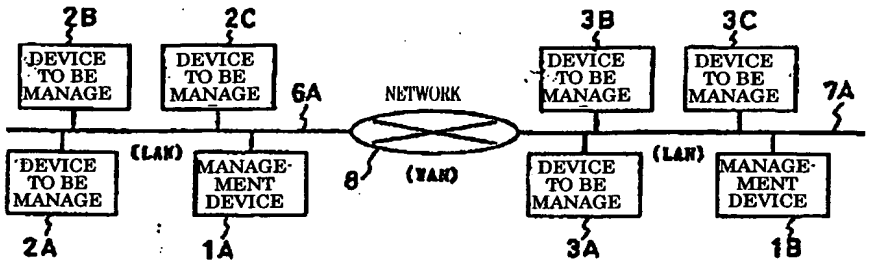
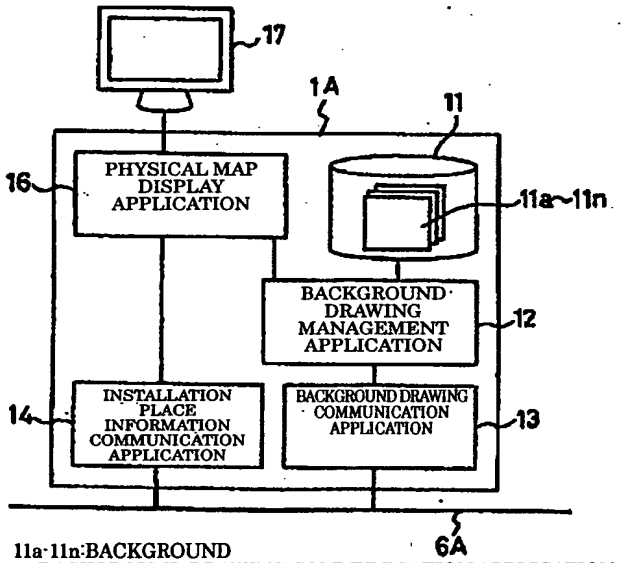
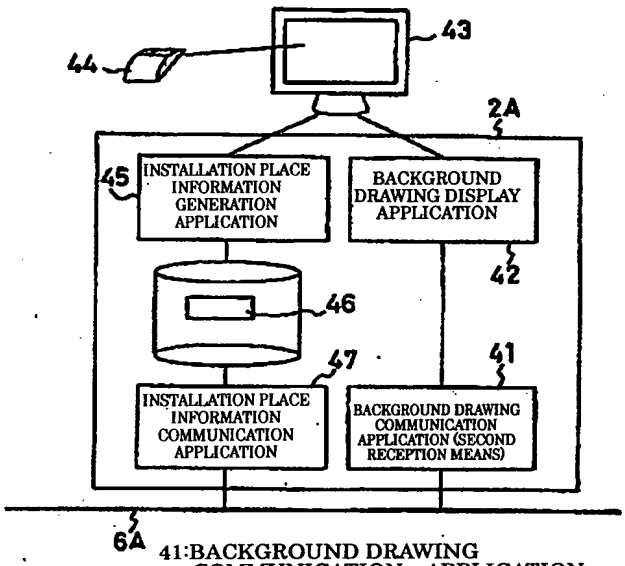


Fig.2



11a-11n:BACKGROUND
13:BACKGROUND DRAWING COMMUNICATION APPLICATION (FIRST TRANSMISSION MEANS)
14:INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION(FIRST RECEPTION MEANS)
16:PHYSICAL MAP DISPLAY APPLICATION (CREATION MEANS)

Fig.3



41:BACKGROUND DRAWING COMMUNICATION APPLICATION (SECOND RECEPTION MEANS)

Fig.11

81 ID OF DEVICE TO BE MANAGED	82 BACKGROUND DRAWING ID	83 COORDINATES
A	1	(Xa, Ya)
B	UNREGISTERED	
C	2	(Xc, Yc)
D	UNREGISTERED	
:		
:		

Fig.12

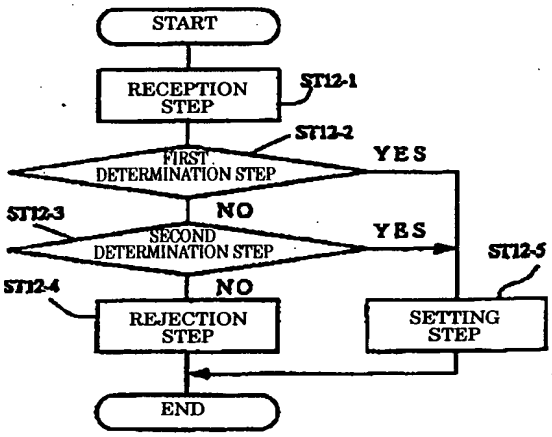


Fig. 4

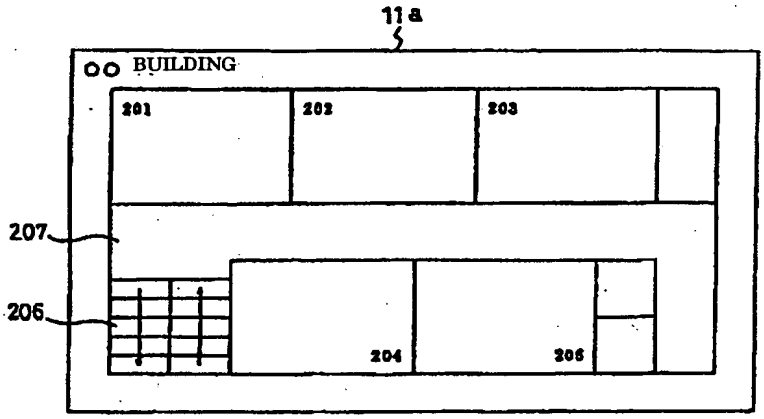


Fig.5

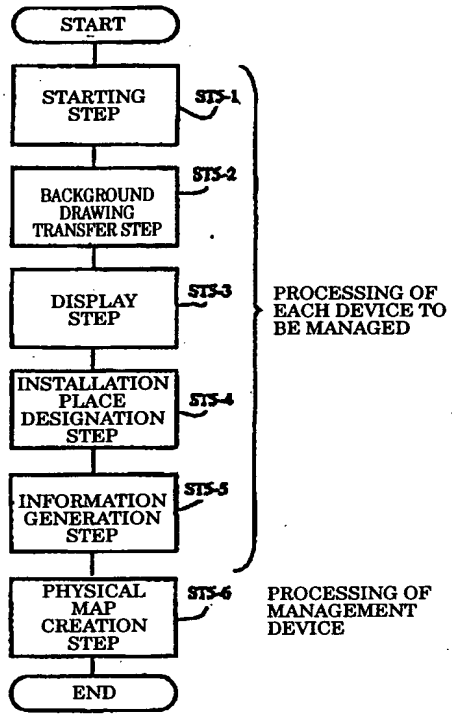


Fig.18

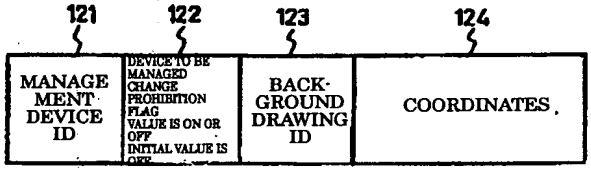


Fig.6

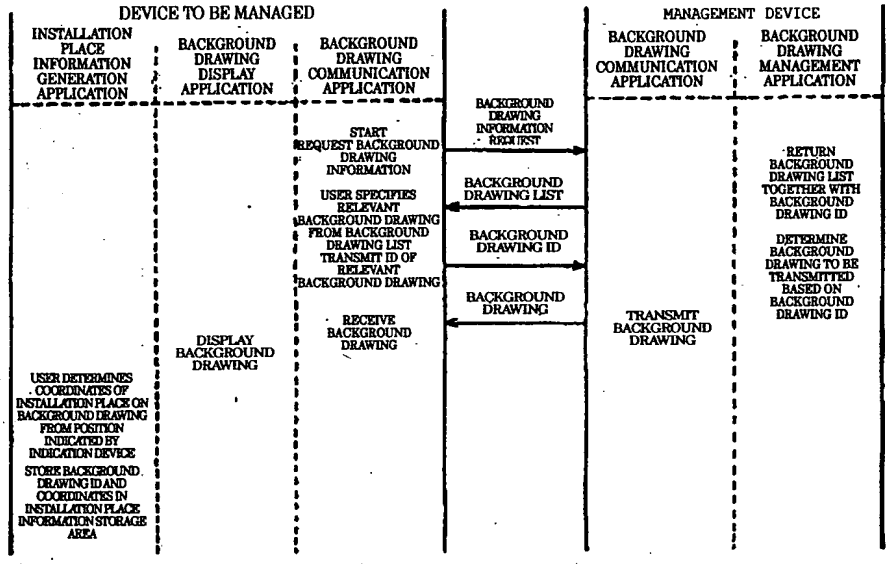


Fig.7

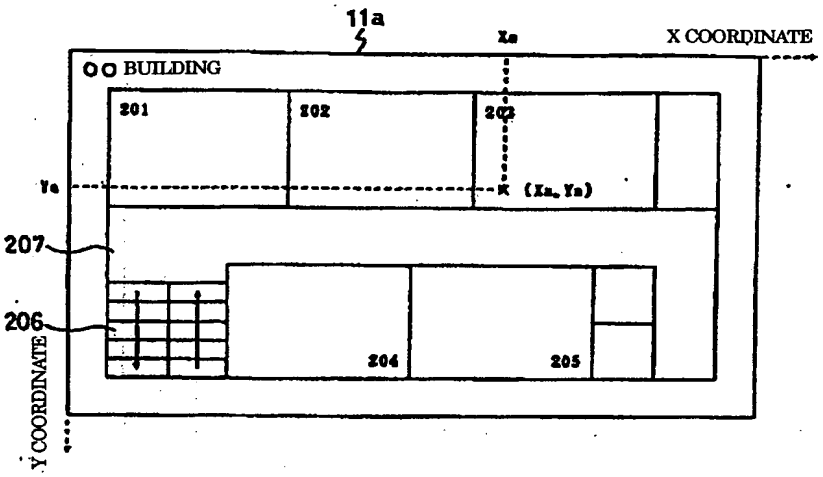
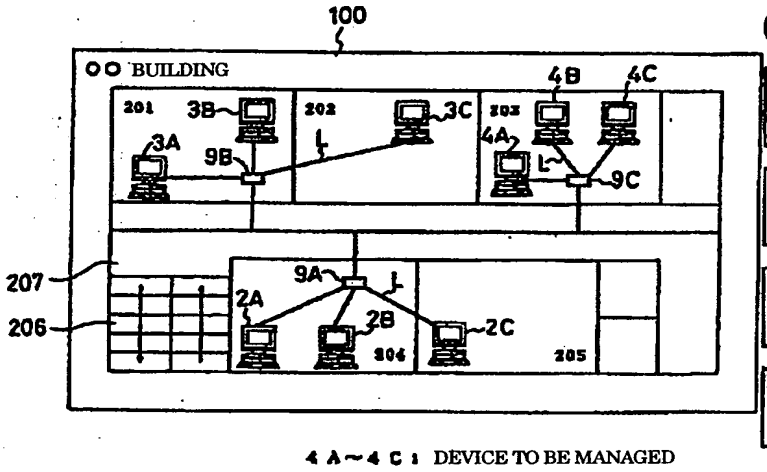


Fig.8



4A～4C : DEVICE TO BE MANAGED

Fig.10

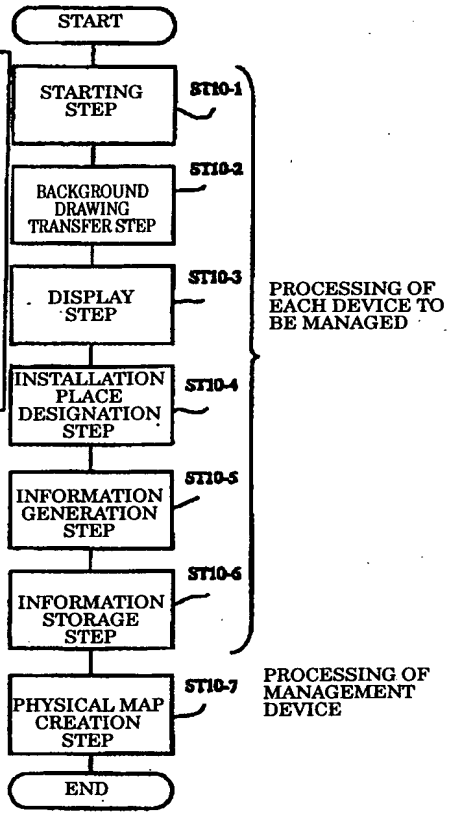


Fig.13

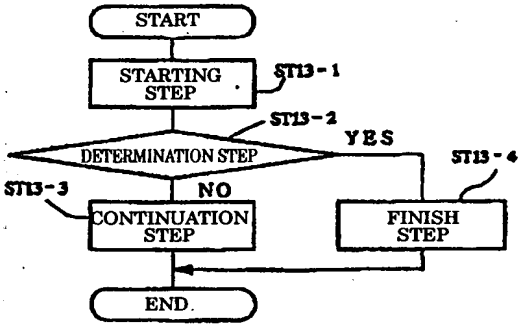
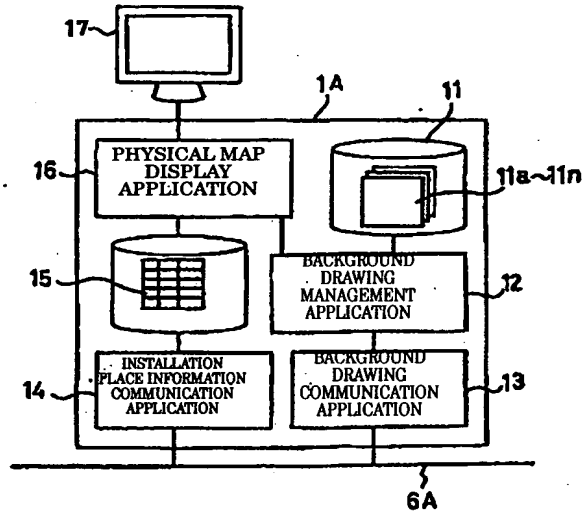


Fig.9



15 : INSTALLATION PLACE INFORMATION TABLE

Fig.14

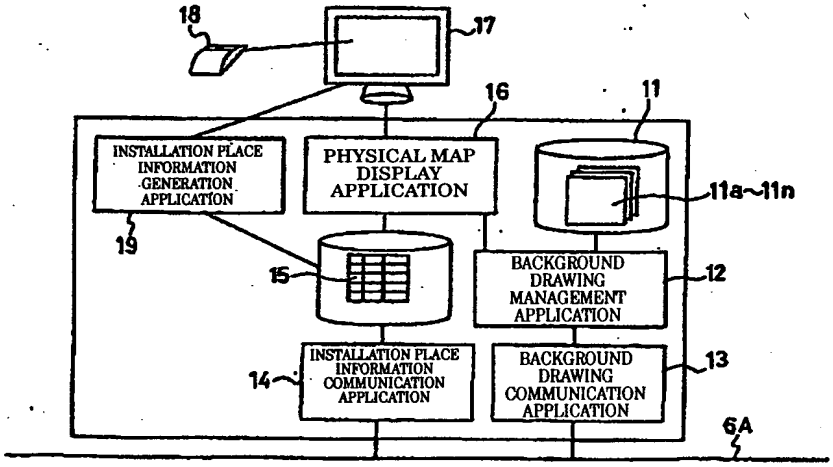


Fig.15

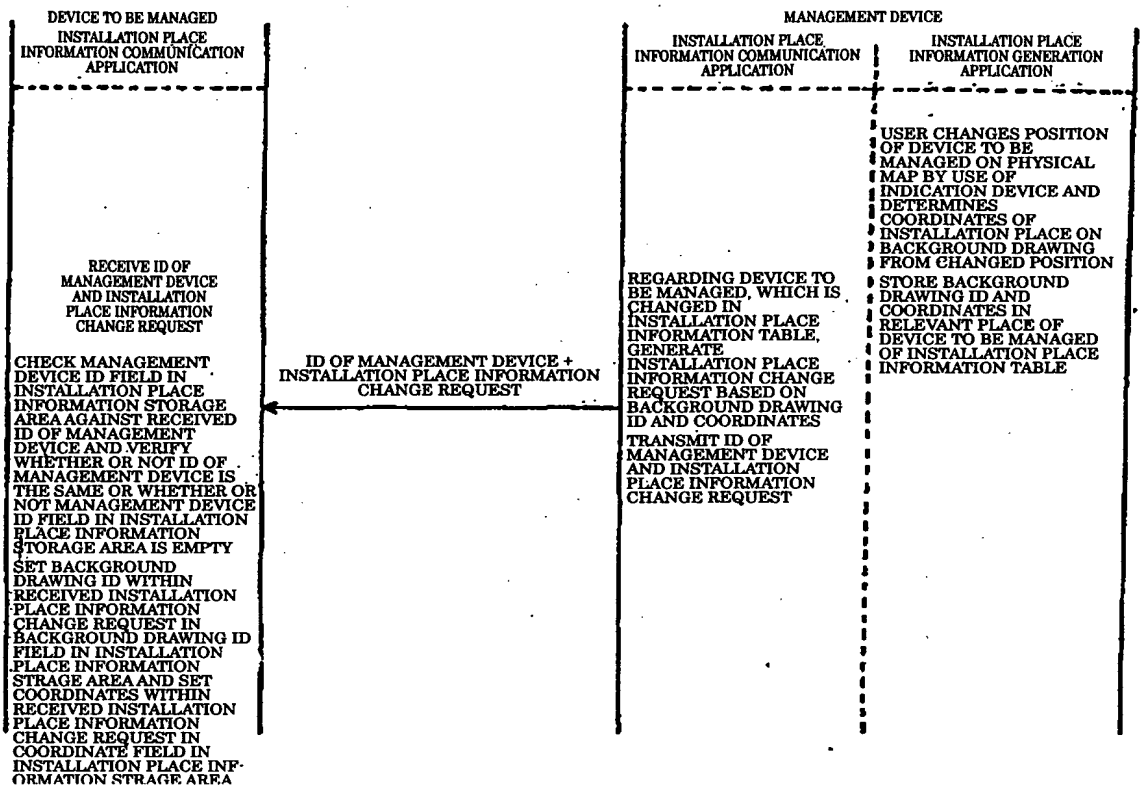

DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
INSTALLATION PLACE INFORMATION GENERATION APPLICATION
USER CHANGES POSITION OF DEVICE TO BE MANAGED ON PHYSICAL MAP BY USE OF INDICATION DEVICE AND DETERMINES COORDINATES OF INSTALLATION PLACE ON BACKGROUND DRAWING FROM CHANGED POSITION
STORE BACKGROUND DRAWING ID AND COORDINATES IN RELEVANT PLACE OF DEVICE TO BE MANAGED OF INSTALLATION PLACE INFORMATION TABLE
REGARDING DEVICE TO BE MANAGED, WHICH IS CHANGED IN INSTALLATION PLACE INFORMATION TABLE, GENERATE INSTALLATION PLACE INFORMATION CHANGE REQUEST BASED ON BACKGROUND DRAWING ID AND COORDINATES
TRANSMIT ID OF MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION CHANGE REQUEST
ID OF MANAGEMENT DEVICE + INSTALLATION PLACE INFORMATION CHANGE REQUEST
RECEIVE ID OF MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION CHANGE REQUEST
CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE AND VERIFY WHETHER OR NOT ID OF MANAGEMENT DEVICE IS THE SAME OR WHETHER OR NOT MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA IS EMPTY
SET BACKGROUND DRAWING ID WITHIN RECEIVED INSTALLATION PLACE INFORMATION CHANGE REQUEST IN BACKGROUND DRAWING ID FIELD IN INSTALLATION PLACE INFORMATION STRAGE AREA AND SET COORDINATES WITHIN RECEIVED INSTALLATION PLACE INFORMATION CHANGE REQUEST IN COORDINATE FIELD IN INSTALLATION PLACE INFORMATION STRAGE AREA

Fig.16

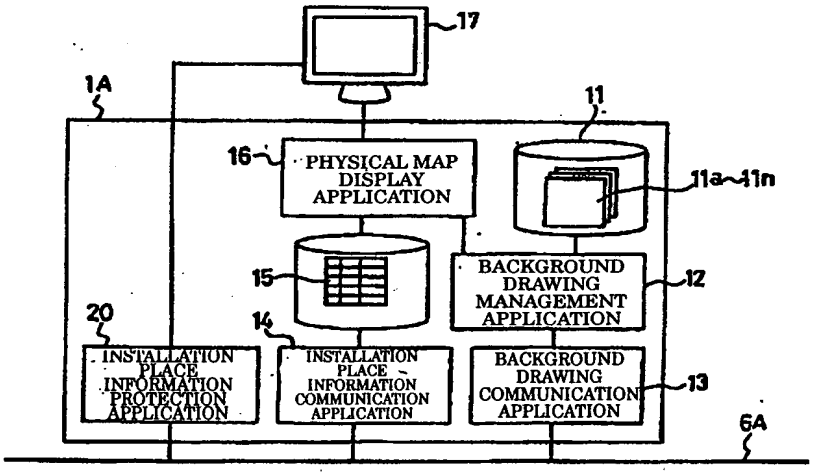

17
1A
11
16
PHYSICAL MAP DISPLAY APPLICATION
11a~11n
15
BACKGROUND DRAWING MANAGEMENT APPLICATION
12
20
14
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
BACKGROUND DRAWING COMMUNICATION APPLICATION
13
6A

Fig.17

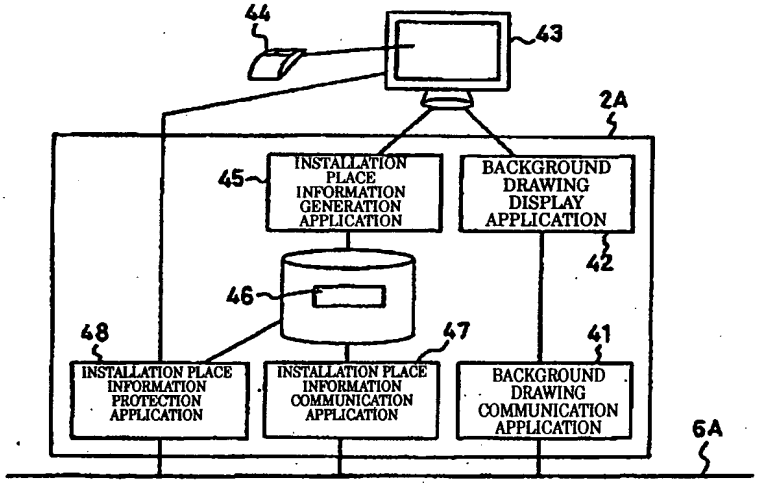


Fig.19

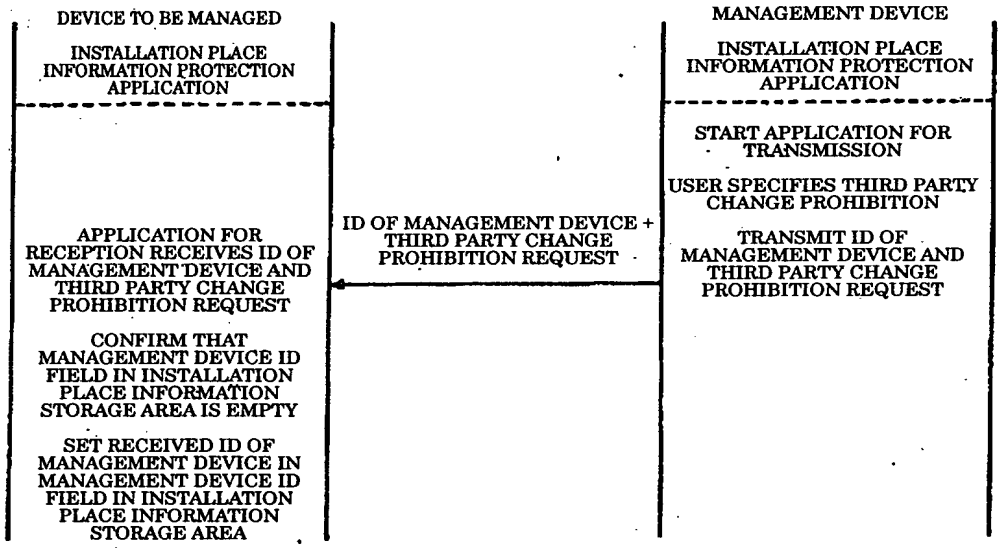


Fig.23

191 ID OF DEVICE TO BE MANAGED	192 BACKGROUND DRAWING ID	193 COORDINATES	194 ID LIST OF DEVICE TO BE MANAGED
A	1	(Xa, Ya)	
B	UNREGISTERED		
C	2	(Xc, Yc)	
D	1	(Xd, Yd)	
HUB E	1	(Xe, Ye)	A, D
:			

Fig.20

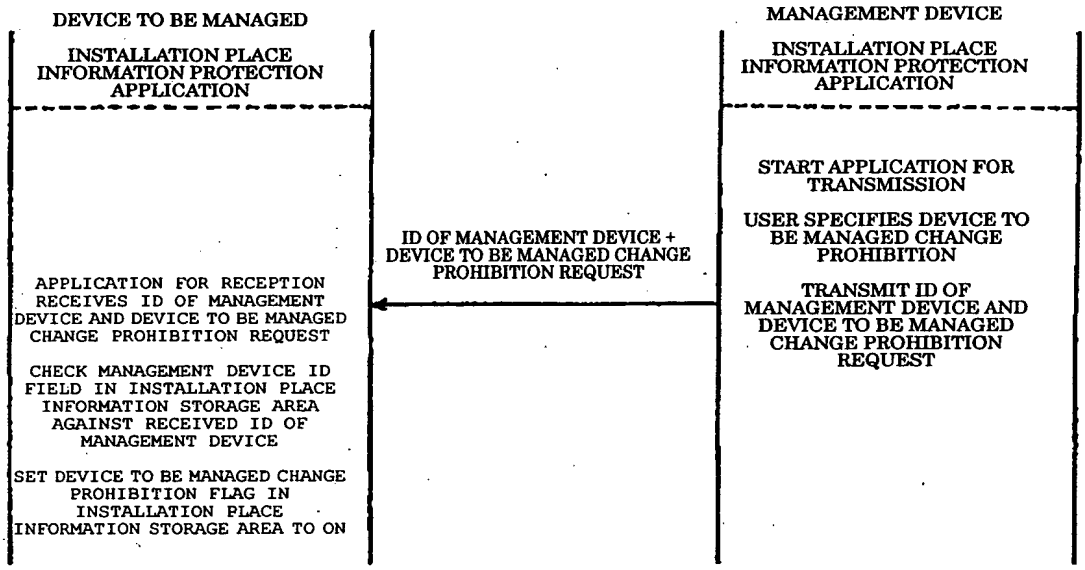

DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
START APPLICATION FOR TRANSMISSION
USER SPECIFIES DEVICE TO BE MANAGED CHANGE PROHIBITION
TRANSMIT ID OF MANAGEMENT DEVICE AND DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST
ID OF MANAGEMENT DEVICE + DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST
APPLICATION FOR RECEPTION RECEIVES ID OF MANAGEMENT DEVICE AND DEVICE TO BE MANAGED CHANGE PROHIBITION REQUEST
CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE
SET DEVICE TO BE MANAGED CHANGE PROHIBITION FLAG IN INSTALLATION PLACE INFORMATION STORAGE AREA TO ON

Fig.21

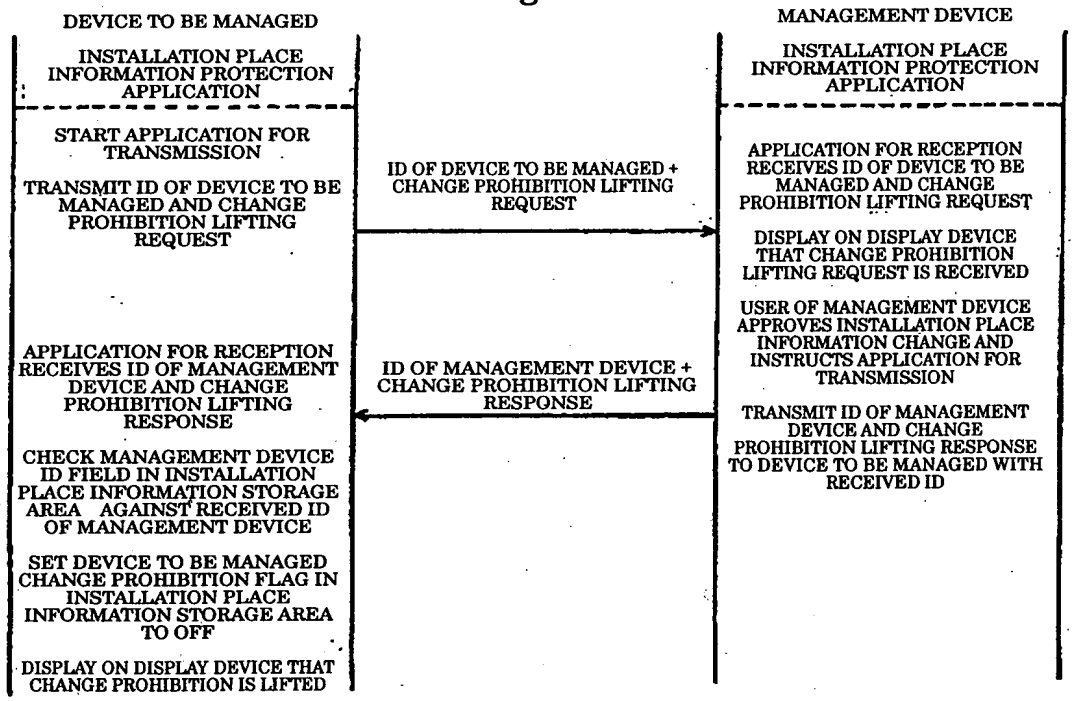
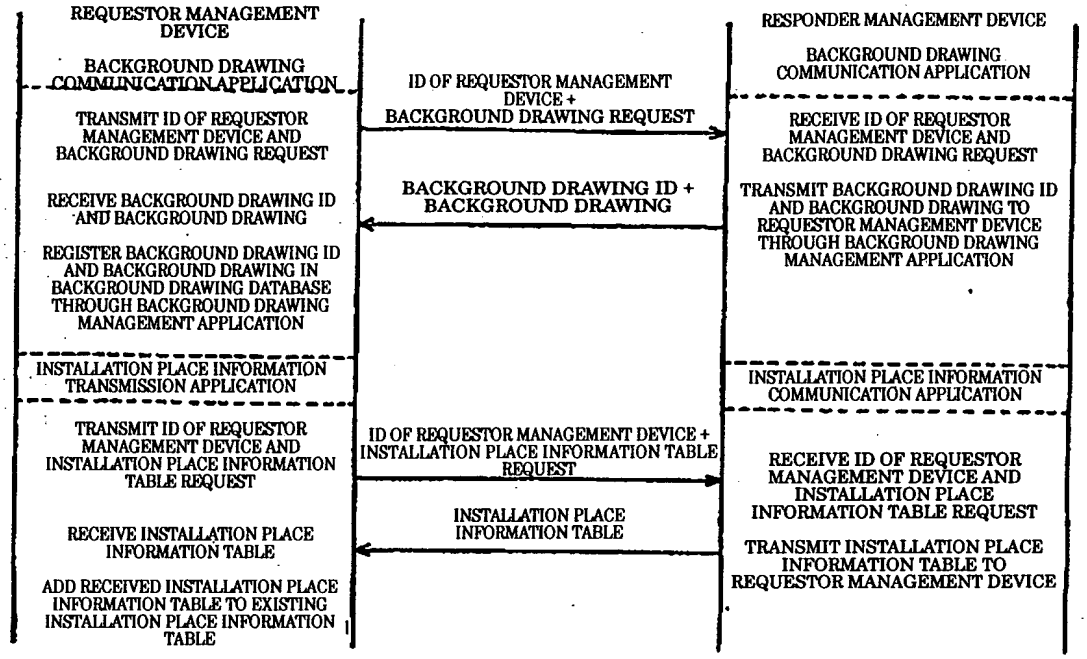

DEVICE TO BE MANAGED
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
MANAGEMENT DEVICE
INSTALLATION PLACE INFORMATION PROTECTION APPLICATION
START APPLICATION FOR TRANSMISSION
TRANSMIT ID OF DEVICE TO BE MANAGED AND CHANGE PROHIBITION LIFTING REQUEST
ID OF DEVICE TO BE MANAGED + CHANGE PROHIBITION LIFTING REQUEST
APPLICATION FOR RECEPTION RECEIVES ID OF DEVICE TO BE MANAGED AND CHANGE PROHIBITION LIFTING REQUEST
DISPLAY ON DISPLAY DEVICE THAT CHANGE PROHIBITION LIFTING REQUEST IS RECEIVED
USER OF MANAGEMENT DEVICE APPROVES INSTALLATION PLACE INFORMATION CHANGE AND INSTRUCTS APPLICATION FOR TRANSMISSION
TRANSMIT ID OF MANAGEMENT DEVICE AND CHANGE PROHIBITION LIFTING RESPONSE TO DEVICE TO BE MANAGED WITH RECEIVED ID
ID OF MANAGEMENT DEVICE + CHANGE PROHIBITION LIFTING RESPONSE
APPLICATION FOR RECEPTION RECEIVES ID OF MANAGEMENT DEVICE AND CHANGE PROHIBITION LIFTING RESPONSE
CHECK MANAGEMENT DEVICE ID FIELD IN INSTALLATION PLACE INFORMATION STORAGE AREA AGAINST RECEIVED ID OF MANAGEMENT DEVICE
SET DEVICE TO BE MANAGED CHANGE PROHIBITION FLAG IN INSTALLATION PLACE INFORMATION STORAGE AREA TO OFF
DISPLAY ON DISPLAY DEVICE THAT CHANGE PROHIBITION IS LIFTED

Fig.22


REQUESTOR MANAGEMENT DEVICE
BACKGROUND DRAWING COMMUNICATION APPLICATION
TRANSMIT ID OF REQUESTOR MANAGEMENT DEVICE AND BACKGROUND DRAWING REQUEST
ID OF REQUESTOR MANAGEMENT DEVICE + BACKGROUND DRAWING REQUEST
RESPONDER MANAGEMENT DEVICE
BACKGROUND DRAWING COMMUNICATION APPLICATION
RECEIVE ID OF REQUESTOR MANAGEMENT DEVICE AND BACKGROUND DRAWING REQUEST
TRANSMIT BACKGROUND DRAWING ID AND BACKGROUND DRAWING TO REQUESTOR MANAGEMENT DEVICE THROUGH BACKGROUND DRAWING MANAGEMENT APPLICATION
RECEIVE BACKGROUND DRAWING ID AND BACKGROUND DRAWING
BACKGROUND DRAWING ID + BACKGROUND DRAWING
REGISTER BACKGROUND DRAWING ID AND BACKGROUND DRAWING IN BACKGROUND DRAWING DATABASE THROUGH BACKGROUND DRAWING MANAGEMENT APPLICATION
INSTALLATION PLACE INFORMATION TRANSMISSION APPLICATION
INSTALLATION PLACE INFORMATION COMMUNICATION APPLICATION
TRANSMIT ID OF REQUESTOR MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION TABLE REQUEST
ID OF REQUESTOR MANAGEMENT DEVICE + INSTALLATION PLACE INFORMATION TABLE REQUEST
RECEIVE ID OF REQUESTOR MANAGEMENT DEVICE AND INSTALLATION PLACE INFORMATION TABLE REQUEST
RECEIVE INSTALLATION PLACE INFORMATION TABLE
INSTALLATION PLACE INFORMATION TABLE
TRANSMIT INSTALLATION PLACE INFORMATION TABLE TO REQUESTOR MANAGEMENT DEVICE
ADD RECEIVED INSTALLATION PLACE INFORMATION TABLE TO EXISTING INSTALLATION PLACE INFORMATION TABLE